

PATENT APPLICATION

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q83823

Johan RANSQUIN, et al.

Appln. No.: 10/510,183

Group Art Unit: 1795

Confirmation No.: 6804

Examiner: Golam Mowla

Filed: September 30, 2004

For: CONCENTRATION SOLAR BATTERY PROTECTED AGAINST HEATING
APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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L. REAL PARTY IN INTEREST

The real party in interest is Alcatel Lucent.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-7 are all of the claims pending in the application.

Claims 1, 3-5 and 7 are rejected under 35 USC 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Horne et al (USP 5,611,870).

Claim 2 is rejected under 35 USC 103(a) as being unpatentable over AAPA in view of Horne et al, and further in view of Chappell et al (USP 4,300,472).

Claim 6 is rejected under 35 USC 103(a) as being unpatentable over AAPA in view of Horne et al, and further in view of Leinkram (USP 3,839,108).

Claims 1-7 are appealed.

IV. STATUS OF AMENDMENTS

There were no amendments made subsequent to the final Office action of March 19, 2009.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention is an improvement in an arrangement of the type (shown in Fig. 1) having a photovoltaic (PV) cell 101 covered by a protection layer 102. Desired radiation (i.e., light in the wavelength range that will lead to efficient PV conversion) passes through the layer 102 while undesired light is reflected away at 105. To improve the output of the PV cell, one or more reflectors 106 are located so as to receive additional light 107 and reflect it toward the cell at 108, with angles of incidence and reflection and the refractive indices being such that desired radiation will be refracted (109) toward the PV cell surface, while undesired radiation (110) is reflected away. The problem addressed by the present invention is that the filtering operation of the layer 102 is not ideal, and much undesired radiation gets through to the PV cell, contributing to the heat build up of the cell without contributing anything to the PV cell output.

The improvement according to the present invention, in its simplest form, is the addition of a filtering layer 206 to the reflecting concentrator, as shown in Fig. 2 and as described at lines 19-21 of page 3 of the specification. As described in the two paragraphs beginning at line 24 of page 3, the light that is of the desired wavelength for exciting the photocell 101 passes through the filter layer 206, is reflected from the reflection surface of the reflecting concentrator 106 and then at the surface of the layer 206 is refracted (radiation 208) toward the surface of the layer 102 where it is refracted (radiation 209) toward the surface of the photocell 101. On the other hand, light of a wavelength that is not suitable for exciting the photocell is reflected (radiation 218) in a direction where it will not strike the photocell 101, thereby avoiding unnecessary heating of the photocell.

As described at lines 7-20 of page 4, the filter layer 206 is of a gradually increasing thickness to create the correct angles to achieve proper directing of the desired light 208 toward the photocell and reflection of the unwanted light 218 away from the photocell.

In an alternate embodiment shown in Fig. 3 and described at lines 26-31 of page 4, the filter layer is an absorbent layer that absorbs the unwanted radiation.

There is only a single independent claim (claim 1) on appeal. In claim 1, the photoelectric cell is at 101 in Figs. 2 and 3, the transparent protection layer is at 102, the reflecting concentrator is at 106, the filter is at 206, such that incident radiation 107 must pass through said filter 206 to reach said reflecting surface in order to be reflected, and after reflection by said reflecting surface must pass again (217) through said filter in order to be directed toward said photoelectric cell, said filter 206 eliminating in the luminous flux directed by the concentrator toward the photoelectric cell most of the "unwanted" radiation that is not able to excite the photoelectric cell.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are:

1. Whether claims 1, 3-5 and 7 are unpatentable over AAPA in view of Horne et al;
2. Whether claim 2 is unpatentable over AAPA in view of Horne et al, and further in view of Chappell et al;
3. Whether claim 6 is unpatentable over AAPA in view of Horne et al, and further in view of Leinkram.

VII. ARGUMENT

1. Claims 1, 3-5 and 7 Are Not Unpatentable Over AAPA In View of Horne et al

The applicant admitted prior art (AAPA) is shown in Fig. 1 of the present application.

Horne is directed to a concept shown in Fig. 7 thereof where a thermal heat source 80 radiates heat through a micromesh filter 50 to obtain a desired transmitted energy spectrum 86. One of the applications of this concept is photovoltaic cells (see, e.g., lines 18-23 of column 1). In Fig. 36 cited by the examiner, incident light would pass through a filter array 172, then through a concentrating prism, and then strike the photovoltaic cell 174. If it is assumed for purposes of this discussion that it would have been obvious to combine the teachings of Horne and the admitted prior art of the present application, one might mount filter and concentrating prism such as 172 and 170 of Horne on top of the photovoltaic cell 101 in Fig. 1 of the present application. The purpose of the layer 102 in figure 1 of the present application is to pass wanted radiation while reflecting unwanted radiation, and one would assume the elements 172 and 170 would replace layer 102 of the present application. This would not result in the invention of the present application.

The examiner in the present Office action proposes that the filter 172 of Horne would be placed over the reflector 106 in the AAPA, but it is submitted that this is only based on hindsight. First, there is already a filter 102 in the AAPA. Second, the filter 172 of Horne, like the filter 102 of the AAPA, is a reflecting filter. It would not have been obvious to place over the reflector 106 in the AAPA a filter which operates by reflection. The reflector 106 lies at an angle with respect to both the incident light 107 and the photocell 101 such that light reflected from the reflector will be directed (108) toward the PV cell. A filter layer of constant thickness (like layer 172 of Horne) and whose reflecting surface is therefore parallel to the reflector 106, and whose primary filtering function is reflection of undesired radiation, would end up reflecting all of that undesired radiation toward the PV cell. So in the arrangement proposed by the examiner the reflecting filter 172 placed over the concentrating reflector 106 would be useless. This could not possibly have been obvious.

Regarding claim 3, it is noted that it is dependent on claim 2 but claim 2 is not included in the grounds of rejection applied to claim 3. Since the subject matter of claim 2 is not taught in the combination of AAPA and Horne, claim 3 cannot be unpatentable over these same two references. To the extent the examiner may have intended to include claim 3 in the rejection of claim 2, claim 3 will be further discussed below.

Claims 4 and 5 are directed to the arrangement in Fig. 2 where the filter layer 206 is of gradually changing thickness so that inclined surface will reflect unwanted radiation (218) away and at the same time will refract (208) the desired reflected radiation (217) toward the PV cell. The thickness change and surface orientation recited in claims 4-5 is specific to the manner in which the filter of Fig. 2 operates, which is totally different from Horne. Contrary to the examiner's assertion that there is no disclosure as to the impact of the claimed thickness changes, note Fig. 2 which illustrates how the inclination of the surface 116 relative to the surface of 106 will impact the reflection angles and thereby impact what is or is not reflected or the angles of refraction of whatever is not reflected, both the first time through the filter and the second time through the filter. And the specification at page 4 describes in detail the role of inclining the surface 116. The examiner disagrees with this in the Advisory Action of July 28, but looks only at the drawings and ignores the description in the specification of the role of the thickness change and inclined surfaces. Horne teaches reflection, but not controlling the inclination angle of the surface of the filter as is recited in claims 4-5.

2. Claim 2 Is Not Unpatentable Over AAPA In View of Horne et al, And Further In View of Chappell et al

As discussed above, Claims 2 and 3 are directed to an embodiment as shown in Fig. 3 where the thickness of the layer 306 is uniform and the filtering function is by absorption. The examiner relies additionally on Chappell in rejecting claim 2, but this simply illustrates the problem of why the basic rejection of the parent claim is unwarranted. As also discussed above, a reflecting filter over the reflector 106 would be unworkable, because it would simply reflect the unwanted radiation toward the photocell. Thus, before placing the Horne filter layer 172 over the reflector 106 of the AAPA, one must first change the fundamental filtering mechanism from

reflection to absorption, and/or modify the structure of the filter layer such that the reflected light is no longer directed to the PV cell. But this is counterintuitive when you start with the AAPA arrangement where the whole purpose of the reflector 106 is to reflect light toward the PV cell.

3. Claim 6 Is Not Unpatentable Over AAPA In View of Horne et al, And Further In View of Leinkram

Claim 6 is dependent on claim 4 which is dependent on claim 1. For the reasons given above, it would not have been obvious to place a filter layer over the reflector 106 in the AAPA if the filter layer filters by reflection, because the unwanted reflected light would simply be directed to the PV cell, which would be undesirable. Yet in his rejection of claim 6 the only reason the examiner gives for modifying the filter layer to include the Fresnel steps of Leinkram would have been to obtain a theoretically ideal Fresnel lens plate and thereby increase reflection (final Office action, page 6). This would not make sense.

The examiner's proposal for modifying the AAPA arrangement in view of Leinkram is clearly motivated by hindsight, and should be reversed.

Conclusion –

For the reasons given above, it is submitted that the combination of the teachings of the cited art in a manner to realize the claimed invention would not have been obvious reversal of all rejections is respectfully requested.

Respectfully submitted,

/DJCushing/
David J. Cushing
Registration No. 28,703

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
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CUSTOMER NUMBER

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CLAIMS APPENDIX

CLAIMS 1-7 ON APPEAL:

1. A concentrator photovoltaic generator, comprising at least one photoelectric cell covered by a transparent protection layer and further comprising a reflecting concentrator for directing luminous flux toward said photoelectric cell, said concentrator having a reflecting surface for reflecting incident radiation, characterized in that the reflecting surface of said concentrator is covered by a filter such that incident radiation must pass through said filter to reach said reflecting surface in order to be reflected, and after reflection by said reflecting surface must pass again through said filter in order to be directed toward said photoelectric cell, said filter eliminating in the luminous flux directed by the concentrator toward the photoelectric cell most of the "unwanted" radiation that is not able to excite the photoelectric cell.
2. A generator according to claim 1, characterized in that the filter is formed of a filter layer made from materials absorbing the "unwanted" portion of the radiation.
3. A generator according to claim 2, characterized in that the filter layer is of constant thickness.
4. A generator according to claim 1, characterized in that the filter is formed of a filter layer whose exterior face is oriented to divert this "unwanted" radiation away from the photoelectric cell.

5. A generator according to claim 4, characterized in that the filter layer is of decreasing thickness so that its exterior face is not parallel to the reflecting surface of the concentrator.
6. A generator according to either claim 4, characterized in that the exterior face of the filter layer is etched to form Fresnel steps.
7. A generator according to claim 1, wherein said filter is formed of a material reflecting the "unwanted" portion of the radiation.

EVIDENCE APPENDIX:

There is no evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by a court or the Board in any proceeding identified about in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).